

CLAIMS

1 1. A magnetic head including a spin valve sensor comprising:
2 a magnetic shield layer (S1) being fabricated above a substrate base;
3 a first electrical insulation layer (G1) being fabricated above said S1 layer;
4 a spin valve sensor structure being disposed above said G1 layer;
5 wherein said spin valve sensor structure includes a seed layer being fabricated above said
6 G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic
7 layer and at least one free magnetic layer being disposed above said PtMn layer; and
8 wherein said seed layer includes an Al_2O_3 sublayer, an NiMnO sublayer, and an Si
9 sublayer.

1 2. A magnetic head as described in claim 1 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 10 to 40 Å.

1 3. A magnetic head as described in claim 1 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å.

1 4. A magnetic head as described in claim 2 wherein said PtMn layer has a thickness of
2 approximately 120 Å.

1 5. A magnetic head as described in claim 1 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å and said PtMn layer has a thickness of approximately
3 120 Å.

1 6. A magnetic head as described in claim 5 wherein said spin valve sensor layers include at
2 least one pinned magnetic layer having a composition including CoFe and at least one spacer
3 layer having a composition including Cu, and at least one free magnetic layer having a
4 composition including Co or CoFe.

1 7. A magnetic head as described in claim 1 wherein said Si sublayer has an etched upper
2 surface.

1 8. A magnetic head including a spin valve sensor comprising:
2 a magnetic shield layer (S1) being fabricated above a substrate base;
3 a first electrical insulation layer (G1) being fabricated above said S1 layer;
4 a spin valve sensor structure being disposed above said G1 layer;
5 wherein said spin valve sensor structure includes a seed layer being fabricated above said
6 G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic
7 layer and at least one free magnetic layer being disposed above said PtMn layer; and
8 wherein said seed layer has an upper surface comprised of Si having an etched surface
9 structure.

1 9. A magnetic head as described in claim 8, wherein said seed layer includes seed sublayers
2 including Al_2O_3 , NiMnO and Si.

1 10. A magnetic head as described in claim 9 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 10 to 40 Å.

1 11. A magnetic head as described in claim 9 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å.

1 12. A magnetic head as described in claim 8 wherein said PtMn layer has a thickness of
2 approximately 120 Å.

1 13. A magnetic head as described in claim 8 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å and said PtMn layer has a thickness of approximately
3 120 Å.

1 14. A magnetic head as described in claim 13 wherein said spin valve sensor layers include at
2 least one pinned magnetic layer having a composition including CoFe and at least one spacer
3 layer having a composition including Cu, and at least one free magnetic layer having a
4 composition including Co or CoFe.

1 15. A hard disk drive, including at least one magnetic head having a read head portion
2 comprising:

3 a magnetic shield layer (S1) being fabricated above a substrate base;

4 a first electrical insulation layer (G1) being fabricated above said S1 layer;

5 a spin valve sensor structure being disposed above said G1 layer;

6 wherein said spin valve sensor structure includes a seed layer being fabricated above said

7 G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic

8 layer and at least one free magnetic layer; and

9 wherein said seed layer includes an Al_2O_3 sublayer, an NiMnO sublayer and an Si
10 sublayer.

1 16. A hard disk drive as described in claim 15 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 10 to 40 Å.

1 17. A hard disk drive as described in claim 15 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å.

1 18. A hard disk drive as described in claim 16 wherein said PtMn layer has a thickness of
2 approximately 120 Å.

1 19. A hard disk drive as described in claim 15 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å and said PtMn layer has a thickness of approximately
3 120 Å.

1 20. A hard disk drive as described in claim 19 wherein said spin valve sensor layers include
2 at least one pinned magnetic layer having a composition including CoFe and at least one spacer
3 layer having a composition including Cu, and at least one free magnetic layer having a
4 composition including Co or CoFe.

1 21. A hard disk drive as described in claim 15 wherein said Si sublayer has an etched upper
2 surface.

1 22. A hard disk drive, including at least one magnetic head having a read head portion
2 comprising:

3 a magnetic shield layer (S1) being fabricated above a substrate base;

4 a first electrical insulation layer (G1) being fabricated above said S1 layer;

5 a spin valve sensor structure being disposed above said G1 layer;

6 wherein said spin valve sensor structure includes a seed layer being fabricated above said
7 G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic
8 layer and at least one free magnetic layer; and

9 wherein said seed layer has an upper surface comprised of Si having an etched surface
10 structure.

1 23. A hard disk drive as described in claim 22, wherein said seed layer includes seed
2 sublayers including Al_2O_3 , NiMnO and Si.

1 24. A hard disk drive as described in claim 23 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 10 to 40 Å.

1 25. A hard disk drive as described in claim 23 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å.

1 26. A hard disk drive as described in claim 24 wherein said PtMn layer has a thickness of
2 approximately 120 Å.

1 27. A hard disk drive as described in claim 23 wherein said Si seed sublayer is fabricated to
2 have a thickness of approximately 20 Å and said PtMn layer has a thickness of approximately
3 120 Å.

1 28. A hard disk drive as described in claim 27 wherein said spin valve sensor layers include
2 at least one pinned magnetic layer having a composition including CoFe and at least one spacer
3 layer having a composition including Cu, and at least one free magnetic layer having a
4 composition including Co or CoFe.

1 29. A method for fabricating a magnetic head including a spin valve sensor, comprising the
2 steps of:

3 fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);

4 fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve
5 sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned
6 magnetic layer and at least one free magnetic layer;

7 wherein said seed layer includes seed sublayers including Al₂O₃, NiMnO and Si.

1 30. A method for fabricating a magnetic head as described in claim 29 wherein said Si seed
2 sublayer is fabricated to have a thickness of approximately 10 to 40 Å.

1 31. A method for fabricating a magnetic head as described in claim 29 wherein said Si seed
2 sublayer is fabricated to have a thickness of approximately 20 Å.

1 32. A method for fabricating a magnetic head as described in claim 30 wherein said PtMn
2 layer has a thickness of approximately 120 Å.

1 33. A method for fabricating a magnetic head as described in claim 29 wherein said Si seed
2 sublayer is fabricated to have a thickness of approximately 20 Å and said PtMn layer has a
3 thickness of approximately 120 Å.

1 34. A method for fabricating a magnetic head as described in claim 33 wherein said spin
2 valve sensor layers include at least one pinned magnetic layer having a composition including
3 CoFe and at least one spacer layer having a composition including Cu, and at least one free
4 magnetic layer having a composition including Co or CoFe.

1 35. A method for fabricating a magnetic head as described in claim 29 including the further
2 step of etching a surface of said Si sublayer prior to the deposition of said PtMn layer thereon.

1 36. A method for fabricating a magnetic head including a spin valve sensor, comprising the
2 steps of:

3 fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);

4 fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve
5 sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned
6 magnetic layer and at least one free magnetic layer;

7 wherein said seed layer is comprised of Al_2O_3 , NiMnO , Si sublayers, and wherein said Si
8 sublayer is fabricated by depositing it to a first thickness and subsequently etching it back to a
9 final thickness before the fabrication of said PtMn layer.

1 37. A method for fabricating a magnetic head as described in claim 36 wherein said Si
2 sublayer is fabricated to have a final thickness of from approximately 10 Å to approximately 40
3 Å.

1 38. A method for fabricating a magnetic head as described in claim 37 wherein said Si
2 sublayer is fabricated to have a final thickness of approximately 20 Å.

1 39. A method for fabricating a magnetic head as described in claim 37 wherein said Si seed
2 sublayer is fabricated to have a thickness of approximately 20 Å and said PtMn layer has a
3 thickness of approximately 120 Å.

1 40. A method for fabricating a magnetic head as described in claim 39 wherein said spin
2 valve sensor layers include at least one pinned magnetic layer having a composition including
3 CoFe and at least one spacer layer having a composition including Cu, and at least one free
4 magnetic layer having a composition including Co or CoFe.